

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

REMARKS

Present Status of the Application

The Advisory Action maintained the rejections cited in the Office Action dated February 23, 2006, in which claims 1-5 and 12 were rejected under 35 U.S.C. 102(b), as being anticipated by Yamazaki et al. (U.S. 2002/0004292), and claims 6-11 and 13-17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki in view of Jung (U.S. 6,825,493).

Applicants have amended claims 1 and 13 to correct editorial error and to more appropriately define the present invention. The amendments are well supported by the specification, for example, paragraphs [0037]-[0038] and Figure 4. After entry of the foregoing amendments, claims 1-17 remain pending in the present application. It is believed that no new matter is added by way of these amendments made to the claims or otherwise to the application.

Applicant has most respectfully considered the remarks set forth in this Office Action. Regarding the obvious rejections, it is however strongly believed that the cited references are deficient to adequately teach the claimed features as recited in the presently pending claims. The reasons that motivate the above position of the Applicant are discussed in detail hereafter, upon which reconsideration of the claims is most earnestly solicited.

Claim rejections - 35 USC 102

Applicants respectfully traverse the 102(b) rejection of claims 1-5 and 12 because Yamazaki et al. (U.S. 2002/0004292) does not teach every element recited in these claims.

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

Claim 1 of the present invention is directed to an apparatus for laser annealing an amorphous silicon film. More specifically, claim 1 teaches that the apparatus of the claimed invention comprises a laser beam source module for providing a laser beam, a beam splitter for splitting said laser beam into a first laser beam and a second laser beam, a first photomask disposed on an optical path of said first laser beam and in front of said amorphous silicon film and a second photomask disposed on an optical path of said second laser beam and in front of said amorphous silicon film, wherein said first laser beam is emitted to a first region, and said second laser beam is emitted to a second region after said amorphous silicon film in said first region is recrystallized. Claim 1 also teaches that the first region does not overlap with the second region. In brief, the first photomask and the second photomask are components of the claimed apparatus for laser annealing.

Yamazaki, on the other hand, teaches three embodiments for the structure of a laser apparatus. In all three embodiments, the laser apparatus of Yamazaki simply comprises a plurality of cylindrical lens arrays 202, 203, 502, 503, 612, 613, cylindrical lens 204, 205, 504, 505, 614-615, 617 and reflectors 206, 506, 512-514, 616. There is no where in teachings of Yamazaki that the laser apparatus comprises a pair of photomasks. The Office argues in the previous Office Actions that Yamazaki teaches multiple masks in Figure 7A-E. The Office further argues that "intended used has been continuously held not to be germane in determining the patentability of an apparatus". Applicants respectfully disagree with the Office's interpretation in this regard. In Figure 7A-E, Yamazaki teaches the application of resists masks

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

721a to 721e as ion implant barriers. Ion implant masks block ion beam and they are normally made of silicon dioxide, silicon nitride, aluminum and other thin metal films. On the other hand, photomasks are glass plate covered with an array of patterns, wherein each pattern consists of opaque and clear areas that respectively prevent or allow light through. Therefore, it is not a matter of "intended use" as alleged by the Office, implant masks and photomasks are fundamentally different elements because not only their applications are different, they are also different in structures and properties. Further, the resist masks of Yamazaki are not a part of the laser annealing apparatus. Instead, these resist masks are used to form LDD region after the crystallization process is performed onto the island semiconductor layers 704 to 708.

The Examiner further argues that Yamazaki teaches the use of photo-masks in paragraphs [0113], [0118], [0119], [0128], [0129] in the telephonic interview dated April 6, 2006; and thus reads on the teaching of photoresist mask in the instant case. Applicants again disagree with the Office in this regard. Yamazaki specifically teaches that the photo-mask is used in photolithograph to form the resist masks (for example, See [0113]). Therefore, the photo-mask of Yamazaki is not a component of the laser annealing apparatus. Further, it is well known in the art that photolithography uses UV lights and not laser beam. Therefore, the photo-mask of Yamazaki can not be disposed on an optical path of the laser beam. Moreover, the resist masks of Yamazaki are patterned by a single photo-mask. The present invention teaches, on the other hand, the application of two photomasks, each being disposed on an optical path of a different laser beam.

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

In addition, as specifically taught in claim 1 of the present application, both the first and second laser beam emit to the front of the amorphous layer because the first and second photomasks are disposed in front of the amorphous silicon film. However, the primary laser light and the second laser light disclosed by Yamazaki respectively emit to the front of the amorphous layer and the back of the amorphous layer. The construction of Yamazaki's laser annealing apparatus is thus different from that of claim 1.

In order "[f]or a prior art reference to anticipate in terms of 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference. These elements must be arranged as in the claim under review". See *In re Bond*, 910, F. 2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). Since Yamazaki fails to teach or suggest many aspects of the claim in issue, Applicants respectfully submit that independent claim 1 patently defines over the prior art reference, and should be allowed. For at least the same reasons, dependent claims 2-5 and 12 patently define over the prior art as a matter of law, for at least the reason that these dependent claims contain all features of their independent claim.

Claim rejections - 35 USC 103

The Office Action rejected claims 6-11 and 13-17 under 35 U.S.C. 103(a), as being unpatentable over Yamazaki et al. (U.S. 2002/0004292) in view of Jung (U.S. 6,825,493). Applicant respectfully traverses the rejections for at least the reasons set forth below.

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

With regard to the 103 rejections of claims 6-11 by Yamazaki in view of Jung, Applicants respectfully submit that these claims defined over the prior art references for at least the reasons discussed above.

In particular, Yamazaki at least fails to teach or suggest the dispositions of the first photomask in the optical path of the first laser beam and the second photomask in the optical path of the first and the second laser beam, respectively. Similarly, Jung also fails to teach the application of two photomasks in the optical paths of different laser beams to crystallize different regions. Instead, Jung teaches the application of a single mask and the crystallization of the different regions of the substrate is accomplished by moving the mask, which is what the present invention is trying to avoid.

Regarding to the rejections to claim 13, both Yamazaki and Jung fail to teach or disclose the feature of emitting a second laser beam through a second photomask to a second region of the amorphous silicon film, after the amorphous silicon film in the first region is recrystallized. Jung simply teaches using a single photomask in the silicon crystallization process. Jung is completely silent about emitting a second laser beam to a second region of the amorphous silicon film, after the amorphous silicon film in the first region is recrystallized. Yamazaki is completely silent about the application of any photomask through which laser beam can be emitted to the first and second regions of said amorphous silicon film.

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

Accordingly, even if there were motivation to combine the two references, the combination still fails to teach or suggest each and every element in claim 13. Thus, a prima facie case of obviousness for claim 13 has not been established by the Office Action.

For at least the foregoing reasons, Applicant respectfully submits that independent claim 13 patentably defines over the prior art references, and should be allowed. For at least the same reasons, dependent claims 14-17 patentably define over the prior art as well.

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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Respectfully submitted,

Belinda Lee
Belinda Lee

Registration No.: 46,863

Jianq Chyun Intellectual Property Office
7th Floor-1, No. 100
Roosevelt Road, Section 2
Taipei, 100
Taiwan
Tel: 011-886-2-2369-2800
Fax: 011-886-2-2369-7233
Email: belinda@jicpgroup.com.tw
Usa@jicpgroup.com.tw